

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-208753

(43)Date of publication of application : 11.08.1995

(51)Int.Cl.

F24F 1/00

F24F 1/00

F24F 1/00

F24F 13/30

(21)Application number : 06-002094

(71)Applicant : TOSHIBA CORP

(22)Date of filing : 13.01.1994

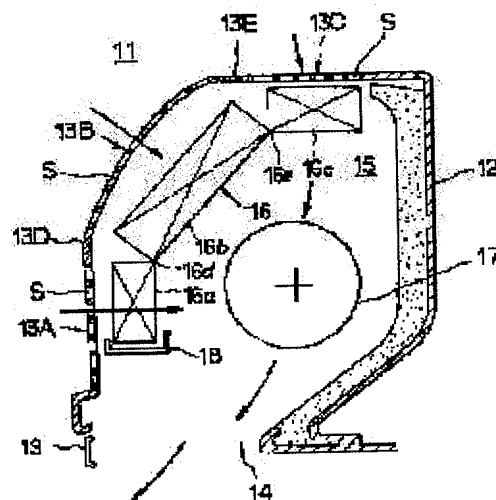
(72)Inventor : NAGASAWA ATSUSHI  
ISSHIKI MASAO

## (54) AIR CONDITIONER

## (57)Abstract:

PURPOSE: To enhance an air conditioning efficiency and to prevent or reduce abnormal sound and condensation.

CONSTITUTION: A heat exchanger 16 and a cross-flow fan 17 are arranged in an air duct 15 for communicating suction ports 13A-13C with a diffuser 14. The exchanger 16 is split to three parts 16a, 16b, 16c. The ports 13A-13C are formed in number equal to or more than the parts 16a-16c of the exchanger 16, and respectively disposed oppositely to the parts 16a-16c.



## \* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

## CLAIMS

[Claim(s)]

[Claim 1]In an air conditioner which allocates a heat exchanger and a cross flow fan in a ventilation flue which makes a suction opening and an outlet open for free passage, An air conditioner having arranged said suction opening so that the number of partitions of said heat

exchanger and more than the same number may form and each dividing part may be countered, respectively while dividing said heat exchanger more than trichotomy.

[Claim 2]The air conditioner according to claim 1 making suction area of each suction opening, and these each suction opening and area of each dividing part of a heat exchanger corresponding, respectively come to be mutually in direct proportion.

[Claim 3]The air conditioner according to claim 1 or 2, wherein each dividing part of each suction opening and a heat exchanger is arranged so that central angles when projected from a rotation center axis of a cross flow fan, respectively may overlap each suction opening corresponding to mutual not less than 60% among each dividing parts.

---

[Translation done.]

\* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

[Detailed Description of the Invention]

[0001]

[Industrial Application]In this invention, the indoor heat exchanger built in in an interior unit is divided into the height direction at plurality, for example, it bends in the shape of [ of \*\* ] a character.

Therefore, the air conditioner aiming at reduction of the height of an interior unit is started, and it is related with the air conditioner which improved the physical relationship of each dividing part of indoor heat exchanger, and a suction opening, etc. especially.

[0002]

[Description of the Prior Art]There are some which were constituted as conventionally shown in drawing 5 as an example of this kind of air conditioner. While this air conditioner forms the suction openings 3a and 3b in the front face and the upper surface of the main part casing 2 of the interior unit 1, respectively, Form the outlet 4 in a front lower part, and the indoor fan 7 which consists of the indoor heat exchanger 6 and a cross flow fan is allocated in the ventilation flue 5 in the main part casing 2 which opens these suction openings 3a and 3b and the outlet 4 for free passage forward and backward, Air conditioning or heating is performed by making indoor air ventilate in the figure Nakaya seal direction.

[0003]the indoor heat exchanger 6 -- a height direction -- for example, two division 6a -- it is 6b carried out, and is bent in the shape of [ of \*\* ] a character, and reduction of the height of the interior unit 2 is aimed at.

[0004]

[Problem(s) to be Solved by the Invention]However, in such a conventional interior unit 1. Since it has met so that each dividing part 6a of the indoor heat exchanger 6 and the bend part 6c which connects 6b and is bent in the shape of [ of \*\* ] a character may be extended towards the front suction opening 3a, much air inhaled from this front suction opening 3a to the direction ventilates also to the bend part 6c.

[0005]Since the ventilation which passes along this bend part 6c does not ventilate each dividing

parts 6a and 6b of the indoor heat exchanger 6, it has a temperature gradient with the ventilation which heat exchange is not carried out, therefore passes along each dividing parts 6a and 6b. And since each ventilation which has these temperature gradients joins by the downstream of the indoor heat exchanger 6 and blows off from the outlet 4 to the interior of a room, air conditioning efficiency falls and also the outlet 4 and indoor fan 7 grade have a technical problem that it is easy to generate with dew.

[0006]For this reason, the necessary spacer which is not illustrated in the bend part 6c is packed, it is necessary to make it not make the bend part 6c ventilate, and an increase and its attachment work of a spacer part article are needed in the former.

[0007]Since the ventilation by which the ventilation which passes along each dividing parts 6a and 6b passes along the bend part 6c while the part and the rate of flow fall, since each dividing parts 6a and 6b serve as a draft resistance does not have this draft resistance, the rate of flow is quick.

[0008]And since the ventilation which have a difference in the rate of flow in this way joins by the downstream of the indoor heat exchanger 6, a turbulent flow occurs and it is easy to generate allophones, such as a wings pitch sound (Py sound).

[0009]Since the bend part 6c is extended towards the front suction opening 3a, the bend part 6c can be seen from the outside surface of the front panel 8, and injures an exterior fine sight. For this reason, in the former, in order to solve these problems, the blocking member 9 was inserted in the bend part 6c, but in order to use the blocking member 9 as a separate part according to this, assembly efficiency fell and cost increased.

[0010]Then, this invention was made in consideration of such a situation, the purpose has high air conditioning efficiency, without using a separate part, and it is in moreover providing the air conditioner which is hard to generate an allophone and with dew.

[0011]

[Means for Solving the Problem]This invention is constituted as follows, in order to solve said technical problem.

[0012]In an air conditioner which allocates a heat exchanger and a cross flow fan in a ventilation flue where the invention of this application according to claim 1 makes a suction opening and an outlet open for free passage, While dividing said heat exchanger more than trichotomy, said suction opening has been arranged so that the number of partitions of said heat exchanger and more than the same number may form and each dividing part may be countered, respectively.

[0013]The invention of this application according to claim 2 makes suction area of each suction opening, and these each suction opening and area of each dividing part of a heat exchanger corresponding, respectively come to be mutually in direct proportion.

[0014]It is arranged so that the invention of this application according to claim 3 may overlap each suction opening corresponding to mutual in central angles when each dividing part of each suction opening and a heat exchanger is projected from a rotation center axis of a cross flow fan, respectively not less than 60% among each dividing parts.

[0015]

[Function]The opening of each suction opening is carried out respectively corresponding to each dividing part of a heat exchanger, and it is closed in the part corresponding to the bend part which connects and bends each dividing parts. For this reason, most air inhaled in the air conditioner from each suction opening ventilates each dividing part of a heat exchanger, and it hardly ventilates it to the bend part which connects each dividing parts.

[0016]Therefore, since each ventilation whose rate of flow and temperature are almost equal in the downstream of a heat exchanger joins, a turbulent flow decreases, it is hard to generate an abnormal noise, air conditioning efficiency improves, and it decreases with the dew to a cross flow fan, an outlet, etc.

[0017]

[Example]Hereafter, the example of this invention is described based on drawing 1 - drawing 3. Identical codes are given to the same or considerable portion among drawing 1 - drawing 3.

[0018]In [ drawing 1 is drawing of longitudinal section of one example of the air conditioner concerning this invention, and ] a figure, An air conditioner has the interior unit 11 and an

exterior unit which is not illustrated, the interior unit 11 is constituted by for example, the wall tapestry type etc., and the front lower part suction opening 13A and the front top suction opening 13B are formed in the lower part and the upper part at the front face of the main part casing 12, respectively.

[0019]Each of these suction openings 13A and 13B allocate in a height direction (drawing 1 sliding direction) two or more small slits S of the necessary width prolonged almost in parallel along with the longitudinal direction (drawing 1 the direction of a rear surface of a drawing) of the main part casing 12 in a necessary pitch, The opening of the outlet 14 is carried out under the low suction mouth 13A.

[0020]The upper surface suction opening 13C to which it comes to carry out the opening of two or more small slits S is formed in the upper surface of the main part casing 12.

These each suction openings 13A-13C and the outlet 14 are open for free passage via the ventilation flue 15 in the main part casing 12, and are allocating in this ventilation flue 15 the indoor fan 17 which consists of the indoor heat exchanger 16 and a cross flow fan forward and backward.

[0021]By the refrigerant piping which is not illustrated, it is connected to pressure reducers, such as a compressor, a four-way valve, an outdoor heat exchanger, and an expansion valve, etc. at sequential and looped shape, and the indoor heat exchanger 16 constitutes a part of closed refrigerating cycle which circulates a refrigerant.

[0022]The indoor heat exchanger 16 has bent the trichotomy 16a and 16b and the bend parts 16d and 16e which are 16c Carried out and for which adjacent ends are connected further among these of the installed number and the same number of each suction openings 13A-13C in the shape of [ of \*\* ] a character to the height direction in the figure.

[0023]And when the indoor heat exchanger 16 arranges each of those dividing parts 16a, 16b, and 16c so that the front lower part suction opening 13A, the front top suction opening 13B, and the upper surface suction opening 13C may be countered, respectively, Each bend parts 16d and 16e of the indoor heat exchanger 16 are arranged in the part which counters the blind parts 13D and 13E closed between each suction opening 13A - 13C.

[0024]Each of those suction opening area SA, SB, and SC constitutes each suction openings 13A, 13B, and 13C so that it may be mostly in direct proportion to the area Sa of each dividing parts 16a, 16b, and 16c of the indoor heat exchanger 16, Sb, and Sc, as shown in the following one formula.

[0025]

[Equation 1]

$$SA : SB : SC \equiv Sa : Sb : Sc$$

[0026]The numerals 18 are a drain pan which receives the drain condensed in the outside surface of the indoor heat exchanger 16, and a louver which controls the blow-off angle of the blow-off style [ 19 ] among drawing 1.

[0027]Next, an operation of this example is explained.

[0028]Since the indoor fan 17 will rotate if the interior unit 11 is operated, indoor air is inhaled in the main part casing 12 from each suction openings 13A-13C, respectively.

[0029]When these each suction air ventilates each dividing parts 16a-16c of the indoor heat exchanger 16, the rate of flow is slowed down a little by the draft resistance, and also heat exchange of it is carried out, it blows off from the outlet 14 to the interior of a room as cold blast or warm air, and air-conditions or heats the interior of a room.

[0030]And since each blind parts 13D and 13E of each suction openings 13A-13C are located ahead [ of each bend parts 16d and 16e of the indoor heat exchanger 16 / opening ], it is hardly ventilated by each bend parts 16d and 16e.

[0031]Since the ventilation which passes along these bend parts 16d and 16e has a temperature gradient in the top where the rate of flow is quick to the ventilation which passes along each dividing parts 16a-16c of the indoor heat exchanger 16 as described above, it makes a fall and abnormal noise of air conditioning efficiency, and a cause with dew, but it decreases substantially

in this example.

[0032]For this reason, in this example, the ventilation whose rate of flow and temperature are almost equal in the downstream of the indoor heat exchanger 16 joins.

[0033]Therefore, since the turbulent flow generated when large ventilation of the rate-of-flow difference joins can be reduced and it can rectify, generating of abnormal noises, such as the Py sound, can be reduced.

[0034]It can be made to decrease with the dew to a fall, and the indoor fan 17 and outlet 14 grade of the heat exchanging efficiency (air conditioning efficiency) generated when large ventilation of a temperature gradient joins.

[0035]Since each bend parts 16d and 16e which injure the exterior fine sight of the indoor heat exchanger 16 are arranged to the inner direction of each blind parts 13D and 13E, respectively and each bend parts 16d and 16e are kept from the ability to be seen from the front face of the interior unit 11, an exterior fine sight can be raised.

[0036]Although said example explained the case where the installed number of each suction openings 13A-13C and the number of partitions of the indoor heat exchanger 16 were set to three of the same numbers, This invention is not limited to this, and it should just form the installed number N of the suction openings 13A-13C so that the number of partitions n of the indoor heat exchanger 16 and more than the same number, i.e.,  $N \geq n$ , may be materialized.

[0037]For example, in the part corresponding to [ in the interior unit 21 of the 2nd example of this invention shown by drawing 2 ] the pars intermedia of the middle dividing part 16b of the indoor heat exchanger 16 for the front top suction opening 13B of said 1st example, By forming the 3rd blind part 13F, it forms to the two suction openings 13B1 and 13 B-2, and the feature is at the point of having set the number of suction openings as four with much one rather than three of the numbers of partitions of the indoor heat exchanger 16.

[0038]The physical relationship of the height direction of each dividing parts 16a-16c of the indoor heat exchanger 16 and each suction openings 13A-13C which counter these, respectively does not necessarily need to be thoroughly in agreement by 1 to 1, For example, when each suction openings 13A-13C and each dividing parts 16a-16c are projected from the center of rotation of the indoor fan 17, respectively, What is necessary is just to position so that the physical relationship of each height direction of the upper row dividing part 16c may overlap mutually [ not less than at least 60% ] the front lower part suction opening 13A, the lower-berth dividing part 16a of the indoor heat exchanger 16 and the front top suction opening 13B, and the middle dividing part 16b and the upper surface suction opening 13C by the central angle of the indoor fan 17. That is, as shown in drawing 3 and drawing 4, the height in a figure of the lower-berth dividing part 16a of the indoor heat exchanger 16, While central angle  $\theta_{aa}$  of the indoor fan 17 shows, the aperture width of the height direction in a figure of the front lower part suction opening 13A which counters this lower-berth dividing part 16a, It expresses with central angle  $\theta_{aA}$  of the indoor fan 17, and when these central angle  $\theta_{aa}$  and  $\theta_{aA}$  sets to  $\theta_{aR}$  further the central angle which overlap mutually, it constitutes so that the following (2) types may be materialized.

[0039]

[Equation 2] $\theta_R \geq \theta_a \times 0.6 \dots (2)$

This (2) type is applied also to the physical relationship of the height direction of the front top suction opening 13B, the middle dividing part 16b and the upper surface suction opening 13C, and the upper row dividing part 16c.

[0040]

[Effect of the Invention]As explained above, this invention is carrying out the opening of each suction opening respectively corresponding to each dividing part of a heat exchanger. It has closed in the part corresponding to the bend part which connects and bends each dividing parts.

For this reason, most air inhaled in the air conditioner from each suction opening even if it did not use separate parts, such as a blocking member, makes each dividing part of a heat exchanger ventilate, and the bend part which connects each dividing parts is not made to almost ventilate it.

[0041]Therefore, since each ventilation whose rate of flow and temperature are almost equal in the downstream of a heat exchanger joins, a turbulent flow decreases, it is hard to generate an abnormal noise, air conditioning efficiency improves, and it decreases with the dew to a cross flow fan, an outlet, etc.

---

[Translation done.]

\* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]Outline drawing of longitudinal section of the 1st example of the air conditioner concerning this invention.

[Drawing 2]Outline drawing of longitudinal section of the 2nd example of the air conditioner concerning this invention.

[Drawing 3]Outline drawing of longitudinal section showing the physical relationship of the height direction of each dividing part of indoor heat exchanger and each suction opening in the example shown by drawing 1.

[Drawing 4]The explanatory view showing a part of physical relationship of the height direction of each dividing part of indoor heat exchanger and each suction opening in the example shown by drawing 1.

[Drawing 5]Outline drawing of longitudinal section of a conventional example.

[Description of Notations]

11 and 21 Interior unit

12 Main part casing

13A Front lower part suction opening

13B, 13B1, and 13 B-2 Front top suction opening

13C Upper surface suction opening

14 Outlet

15 Ventilation flue

16 Indoor heat exchanger

16a The lower-berth dividing part of indoor heat exchanger

16b The middle dividing part of indoor heat exchanger

16c The upper row dividing part of indoor heat exchanger

17 Indoor fan

18 Drain pan

19 Blow-off louver

---

[Translation done.]

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平7-208753

(43) 公開日 平成7年(1995)8月11日

(51) Int.Cl.<sup>5</sup>

F 2 4 F 1/00

識別記号

庁内整理番号

F I

技術表示箇所

3 1 1

6803-3L

4 0 1 B

F 2 4 F 1/00

3 9 1 B

3 9 1 A

審査請求 未請求 請求項の数 3 O L (全 5 頁) 最終頁に続く

(21) 出願番号

特願平6-2094

(22) 出願日

平成6年(1994)1月13日

(71) 出願人 000003078

株式会社東芝

神奈川県川崎市幸区堀川町72番地

(72) 発明者 長澤 敦氏

静岡県富士市蓼原336番地 株式会社東芝

富士工場内

(72) 発明者 一色 正男

静岡県富士市蓼原336番地 株式会社東芝

富士工場内

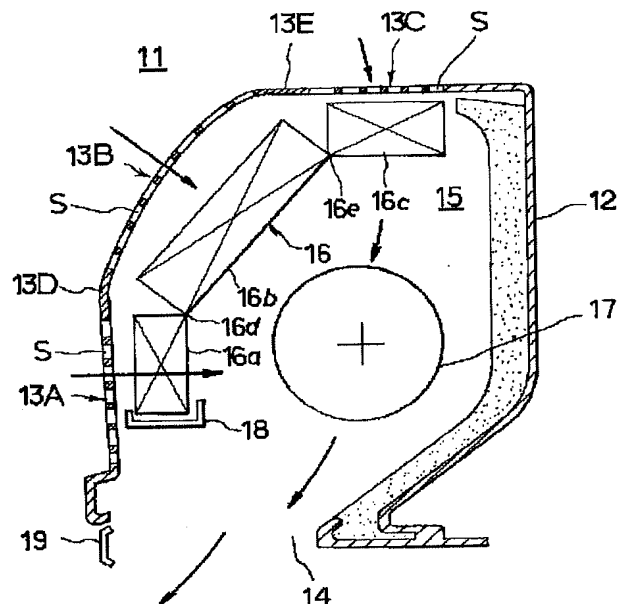
(74) 代理人 弁理士 波多野 久 (外1名)

(54) 【発明の名称】 空気調和機

(57) 【要約】

【目的】 空調効率を高めると共に、異音や露付の発生を防止ないし低減する。

【構成】 各吸込口13A~13Cと吹出口14とを連通せしめる通風路15に熱交換器16と横流ファン17とを配設する。熱交換器16を3分割16a、16b、16cする。吸込口13A~13Cを、熱交換器16の各分割部16a~16cと同数以上形成すると共に、各分割部16a~16cにそれぞれ対向するように配置する。



## 【特許請求の範囲】

【請求項1】 吸込口と吹出口とを連通せしめる通風路に熱交換器と横流ファンとを配設する空気調和機において、前記熱交換器を3分割以上に分割する一方、前記吸込口を、前記熱交換器の分割数と同数以上形成して各分割部にそれぞれ対向するように配置したことを特徴とする空気調和機。

【請求項2】 各吸込口の吸込面積と、これら各吸込口とそれぞれ対応する熱交換器の各分割部の面積とを相互に正比例させてなることを特徴とする請求項1記載の空気調和機。

【請求項3】 各吸込口と熱交換器の各分割部は、横流ファンの回転中心軸からそれぞれ投影されたときの中心角同士が相互に対応する各吸込口と各分割部同士間で60%以上重なり合うように配置されていることを特徴とする請求項1または2記載の空気調和機。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は室内機内に内蔵される室内熱交換器をその高さ方向に複数に分割して例えばくの字状に折曲することにより室内機の高さの低減を図った空気調和機に係り、特に、室内熱交換器の各分割部と吸込口との位置関係等を改良した空気調和機に関する。

## 【0002】

【従来の技術】従来、この種の空気調和機の一例としては図5に示すように構成されたものがある。この空気調和機は室内機1の本体ケーシング2の前面と上面とに吸込口3a、3bをそれぞれ形成する一方、前面下部に吹出口4を形成し、これら吸込口3a、3bと吹出口4を連通する本体ケーシング2内の通風路5に室内熱交換器6と横流ファンよりなる室内ファン7とを前後に配設し、室内空気を図中矢印方向に通風させることにより、冷房または暖房を行なうようになっている。

【0003】室内熱交換器6は高さ方向に例えば2分割6a、6bされて、くの字状に折曲され、室内機2の高さの低減を図っている。

## 【0004】

【発明が解決しようとする課題】しかしながら、このような従来の室内機1では、室内熱交換器6の各分割部6a、6b同士を接続してくの字状に折曲されている折曲部6cが前面吸込口3aに向けて拡開するように対面しているため、この前面吸込口3aからその内方へ吸い込まれた多くの空気が折曲部6cにも通風する。

【0005】この折曲部6cを通る通風は、室内熱交換器6の各分割部6a、6bを通風しないので、熱交換されず、そのために、各分割部6a、6bを通る通風とは温度差を有する。しかも、これら温度差を有する各通風が室内熱交換器6の下流側で合流して吹出口4から室内へ吹き出されるので、空調効率が低下する上に、吹出口4や室内ファン7等に露付が発生し易いという課題があ

る。

【0006】このために、従来では折曲部6c内に図示しない所要のスペースを詰めて、折曲部6cを通風させないようにする必要があり、スペース部品の増加とその組付け作業とが必要となる。

【0007】また、各分割部6a、6bを通る通風は、各分割部6a、6bが通風抵抗となるので、その分、流速が低下する一方、折曲部6cを通る通風はかかる通風抵抗がないので、その流速が速い。

10 【0008】そして、このように流速に差のある通風同士が室内熱交換器6の下流側で合流するので、乱流が発生し、翼ビッチ音（ピー音）等の異音が発生し易い。

【0009】また、折曲部6cが前面吸込口3aに向けて拡開しているため、折曲部6cが前面パネル8の外側から見え、外観上の美観を害する。このために、従来ではこれらの問題を解決するために、折曲部6cに閉塞部材9を挿入していたが、これにより閉塞部材9を別部品とするため、組立効率が低下したり、コストが増大した。

20 【0010】そこで、本発明はこのような事情を考慮してなされたもので、その目的は別部品を用いることなく空調効率が高く、しかも、異音や露付が発生しにくい空気調和機を提供することにある。

## 【0011】

【課題を解決するための手段】本発明は前記課題を解決するために次のように構成される。

【0012】本願の請求項1に記載の発明は、吸込口と吹出口とを連通せしめる通風路に熱交換器と横流ファンとを配設する空気調和機において、前記熱交換器を3分割以上に分割する一方、前記吸込口を、前記熱交換器の分割数と同数以上形成して各分割部にそれぞれ対向するように配置したことを特徴とする。

30 【0013】また、本願の請求項2に記載の発明は、各吸込口の吸込面積と、これら各吸込口とそれぞれ対応する熱交換器の各分割部の面積とを相互に正比例させてなることを特徴とする。

【0014】さらに、本願の請求項3に記載の発明は、各吸込口と熱交換器の各分割部は、横流ファンの回転中心軸からそれぞれ投影されたときの中心角同士が相互に対応する各吸込口と各分割部同士間で60%以上重なり合うように配置されていることを特徴とする。

## 【0015】

【作用】各吸込口は熱交換器の各分割部にそれぞれ対応して開口しており、各分割部同士を接続して折曲する折曲部に対応する箇所では閉じている。このために、各吸込口から空気調和機内に吸い込まれた空気の殆どは、熱交換器の各分割部を通風し、各分割部同士を接続する折曲部には殆ど通風しない。

50 【0016】したがって、熱交換器の下流側では流速と温度がほぼ等しい各通風同士が合流するので、乱流が低



減して異常音が発生しにくい上に、空調効率が向上し、横流ファンや吹出口等への露付きが低減する。

【0017】

【実施例】以下、本発明の実施例を図1～図3に基づいて説明する。なお、図1～図3中、同一または相当部分には同一符号を付している。

【0018】図1は本発明に係る空気調和機の一実施例の縦断面図であり、図において、空気調和機は室内機11と図示しない室外機とを有し、室内機11は例えば壁掛型等に構成され、本体ケーシング12の前面には前面下部吸込口13A、前面上部吸込口13Bとを下部と上部とにそれぞれ形成している。

【0019】これらの各吸込口13A、13Bは本体ケーシング12の長手方向（図1では図面の表裏方向）に沿ってほぼ平行に延びる所要幅の複数の小スリットSを高さ方向（図1では上下方向）に所要のピッチで配設してなり、下部吸込口13Aの下方には吹出口14を開口させている。

【0020】また、本体ケーシング12の上面には、複数の小スリットSを開口させてなる上面吸込口13Cを形成しており、これら各吸込口13A～13Cと吹出口14とは本体ケーシング12内の通風路15を介して連通し、この通風路15には室内熱交換器16と横流ファンよりなる室内ファン17とを前後に配設している。

【0021】室内熱交換器16は図示しない冷媒配管により、コンプレッサ、四方弁、室外熱交換器、膨張弁等の減圧器等に順次かつループ状に接続され、冷媒を循環させる閉じた冷凍サイクルの一部を構成している。

【0022】また、室内熱交換器16は、その図中高さ方向に、各吸込口13A～13Cの設置数と同数の例えば3分割16a、16b、16cし、さらに、これらのうち、隣り合う端部同士を接続する折曲部16d、16eをくの字状に折曲している。

【0023】そして、室内熱交換器16は、その各分割部16a、16b、16cを、前面下部吸込口13A、前面上部吸込口13B、上面吸込口13Cにそれぞれ対向するように配置することにより、室内熱交換器16の各折曲部16d、16eを、各吸込口13A～13C同士間で閉じている盲部13D、13Eに対向する箇所配置している。

【0024】また、各吸込口13A、13B、13Cを、その各吸込口面積SA、SB、SCが室内熱交換器16の各分割部16a、16b、16cの面積Sa、Sb、Scに、次の1式に示すようにほぼ正比例するように構成している。

【0025】

【数1】

$$SA:SB:SC=Sa:Sb:Sc$$

【0026】なお、図1中、符号18は室内熱交換器16の外表面で凝縮するドレンを受けるドレン皿、19は

吹出風の吹出角を制御するルーバである。

【0027】次に本実施例の作用を説明する。

【0028】室内機11を運転すると、室内ファン17が回転するので、室内空気が各吸込口13A～13Cから本体ケーシング12内にそれぞれ吸い込まれる。

【0029】これら各吸込空気は室内熱交換器16の各分割部16a～16cを通風する際に、その通風抵抗により流速が若干減速される上に、熱交換されて、冷風または温風として吹出口14から室内へ吹き出され、室内を冷房または暖房する。

【0030】そして、室内熱交換器16の各折曲部16d、16eの開口部前方に、各吸込口13A～13Cの各盲部13D、13Eを位置させているので、各折曲部16d、16eには殆ど通風されない。

【0031】この折曲部16d、16eを通る通風は、前記したように室内熱交換器16の各分割部16a～16cを通る通風に対して流速が速い上に温度差があるので、空調効率の低下や異常音、露付きの原因をなすものであるが、本実施例では大幅に減少される。

【0032】このために、本実施例では室内熱交換器16の下流側では流速と温度がほぼ等しい通風同士が合流する。

【0033】したがって、流速差の大きい通風同士が合流することにより発生する乱流を低減して整流することができるので、ピー音等の異常音の発生を低減することができる。

【0034】また、温度差の大きい通風同士が合流することにより発生する熱交換効率（空調効率）の低下と、室内ファン17や吹出口14等への露付きを減少させることができる。

【0035】さらに、室内熱交換器16の外観上の美観を害する各折曲部16d、16eを各盲部13D、13Eの内方にそれぞれ配置して、各折曲部16d、16eが室内機11の前面から見えないようにしているので、外観上の美観を高めることができる。

【0036】なお、前記実施例では各吸込口13A～13Cの設置数と室内熱交換器16の分割数とを同数の3つに設定した場合について説明したが、本発明はこれに限定されるものではなく、吸込口13A～13Cの設置数Nを室内熱交換器16の分割数nと同数以上、つまり、 $N \geq n$ が成立するように形成すればよい。

【0037】例えば、図2で示す本発明の第2実施例の室内機21は前記第1実施例の前面上部吸込口13Bを、室内熱交換器16の中段分割部16bの中間部に対応する箇所において、第3の盲部13Fを形成することにより、2つの吸込口13B1、13B2に画成して、吸込口数を室内熱交換器16の分割数の3つよりも1つ多い4つに設定した点に特徴がある。

【0038】また、室内熱交換器16の各分割部16a～16cと、これらにそれぞれ対向する各吸込口13A

～13Cとの高さ方向の位置関係は必ずしも1対1で完全に一致しなくてもよく、例えば室内ファン17の回転中心から各吸込口13A～13Cと各分割部16a～16cをそれぞれ投影したときに、前面下部吸込口13Aと室内熱交換器16の下段分割部16a、前面上部吸込口13Bと中段分割部16b、上面吸込口13Cと上段分割部16cの各高さ方向の位置関係が室内ファン17の中心角で少なくとも60%以上が互いに重なり合うように位置決めすればよい。つまり、図3、図4に示すように、室内熱交換器16の下段分割部16aの図中高さを、室内ファン17の中心角 $\theta a$ で示す一方、この下段分割部16aに対向する前面下部吸込口13Aの図中高さ方向の開口幅を、室内ファン17の中心角 $\theta A$ で表し、さらに、これら中心角 $\theta a$ 、 $\theta A$ 同士が相互に重なり合う中心角を $\theta R$ としたときに、次の(2)式が成立するように構成する。

【0039】

【数2】 $\theta R \geq \theta a \times 0.6$  ……(2)

この(2)式は前面上部吸込口13Bと中段分割部16b、上面吸込口13Cと上段分割部16cとの高さ方向

【0040】

【発明の効果】以上説明したように本発明は、各吸込口を熱交換器の各分割部にそれぞれ対応して開口しており、各分割部同士を接続して折曲する折曲部に対応する箇所では閉じている。このために、閉塞部材等の別部品を用いなくても各吸込口から空気調和機内に吸い込まれた空気の殆どは、熱交換器の各分割部を通過せしめ、各分割部同士を接続する折曲部には殆ど通過させない。

【0041】したがって、熱交換器の下流側では流速と\*

\*温度がほぼ等しい各通風同士が合流するので、乱流が低減して異常音が発生しにくい上に、空調効率が向上し、横流ファンや吹出口等への露付きが低減する。

【図面の簡単な説明】

【図1】本発明に係る空気調和機の第1実施例の概略縦断面図。

【図2】本発明に係る空気調和機の第2実施例の概略縦断面図。

【図3】図1で示す実施例における室内熱交換器の各分割部と各吸込口との高さ方向の位置関係を示す概略縦断面図。

【図4】図1で示す実施例における室内熱交換器の各分割部と各吸込口との高さ方向の位置関係の一部を示す説明図。

【図5】従来例の概略縦断面図。

【符号の説明】

11, 21 室内機

12 本体ケーシング

13A 前面下部吸込口

13B, 13B1, 13B2 前面上部吸込口

13C 上面吸込口

14 吹出口

15 通風路

16 室内熱交換器

16a 室内熱交換器の下段分割部

16b 室内熱交換器の中段分割部

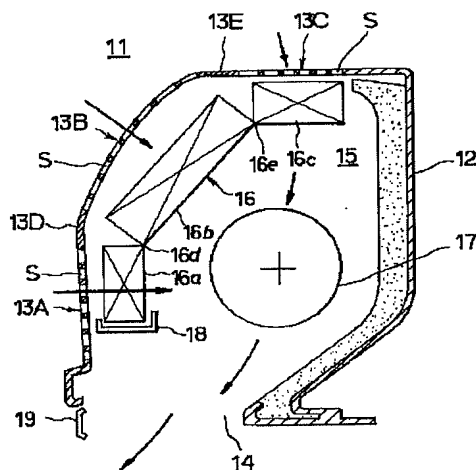
16c 室内熱交換器の上段分割部

17 室内ファン

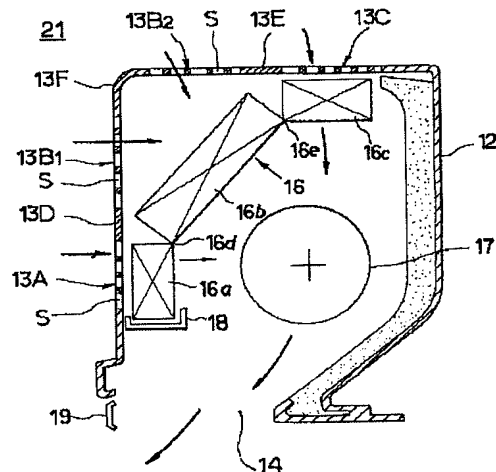
18 ドレン皿

19 吹出ルーバ

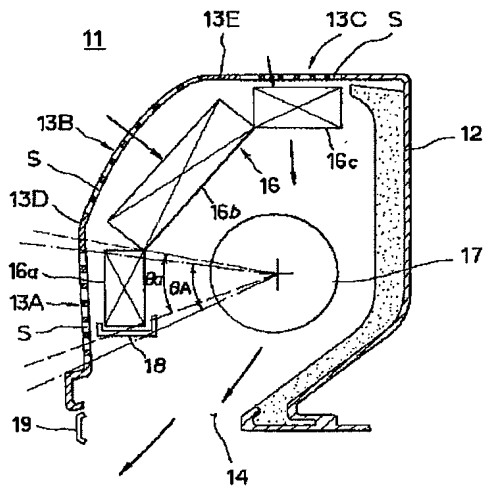
【図1】



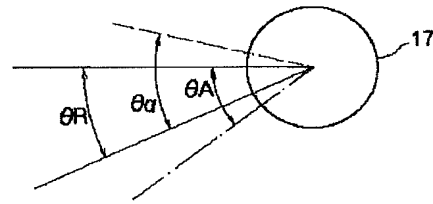
【図2】



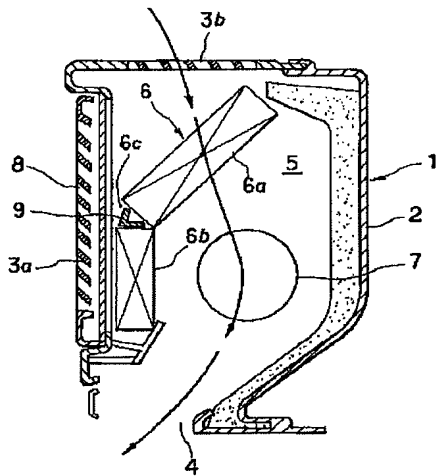
【図3】



【図4】



【図5】



フロントページの続き

(51)Int.Cl.<sup>6</sup>

F 2 4 F 1/00

13/30

識別記号

片内整理番号

C

F I

技術表示箇所